

BPM IN FINANCIAL SERVICES

Good Advice from the Real World

Andy Bonham, Capital One
Peter Loop, Infosys
Emanuele Montrasi, SIA
Phil Simpson, Red Hat

June 30, 2016



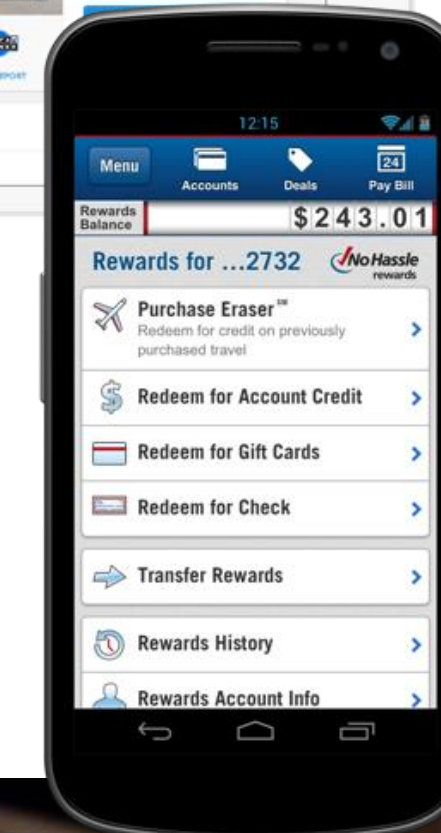
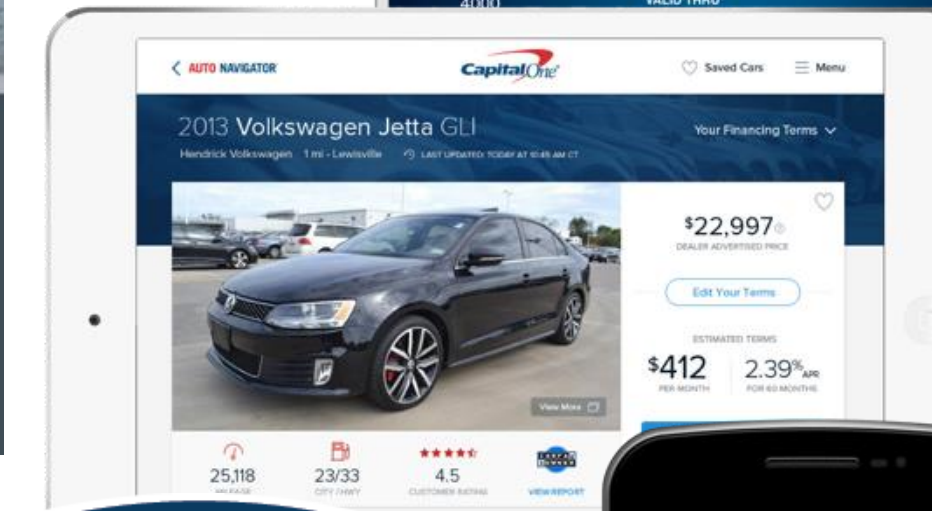
BPM Architectures at Capital One

Andy Bonham

Enterprise Architect, Capital One

Capital One at a glance

- **A leading diversified bank with \$330.3 billion in assets, \$228.9 billion in loans and \$221.8 billion in deposits¹**
 - 8th largest bank based on U.S. deposits²
 - 5th largest retail depository institution in metro New York³
 - Largest consumer and commercial banking institution headquartered in the Washington, DC region
 - 4th largest credit card issuer in the U.S.⁴
 - The 3rd largest issuer of small business Visas and MasterCards in the U.S.⁵
 - The 4th largest financial institution auto loan originator⁶
 - Largest U.S. direct bank⁷
- **Major operations in 15 U.S. cities, Canada, U.K.**
- **More than 65 million customer accounts and 45,000 associates**
- **A FORTUNE 500 Company - #126**
- **Numerous recent awards including:**
 - Named to 100 Best Companies to Work For by *FORTUNE* Magazine
 - Best Places to Work for LGBT Equality by *Human Rights Campaign*
 - Received J.D. Power & Associates Call Center Certification
 - Aon Hewitt's Top Companies for Leaders
 - Named to *Working Mother's* 100 Best Companies list & Best Companies for Hourly Workers
 - Ranked #8 on *Military Times'* 2014 "Best for Vets"
 - Recipient of the Secretary of Defense Employer Support Freedom Award



1) Source: Company reported data as of Q1'16
 2) Source: FDIC, Domestic deposits ranking as of Q4'15
 3) Source: FDIC, June 2015, deposits capped at \$1B per branch
 4) Source: Company-reported domestic credit card outstandings, Q1'16,

5) Source: The Nilson Report, Issue 1066, June 2015
 6) Note: Financial institutions includes banks & specialty finance lenders, Source: AutoCount, FY 2015
 7) Source: FDIC, company reports as of Q4'15

We have transformed the company into a top 10 bank



- 2015** –Acquires GE Capital’s Healthcare Finance, Level Money and Monsoon
- 2014** -- Acquires Adaptive Path, a digital design leader and AmeriCommerce, an online e-commerce company
- 2013** – Acquires Beech Street Capital, an originator, underwriter and servicer of multifamily commercial real estate loans
- 2012** - Acquires ING DIRECT, HSBC US Card portfolio
- 2010** - Enters into card partnerships with Kohl's and Sony in the US and Hudson's Bay Company and Delta in Canada
- 2009** - Acquires Chevy Chase Bank in the Washington, DC area
- 2006** - Acquires North Fork Bank, one of the largest banks in the New York metro area
- 2005** - Acquires Hibernia National Bank, #1 bank in Louisiana
- 2002** - Launches its Small Business credit card
- 2000** - Introduces slogan, “What’s in your wallet?”
- 1998** - Enters Auto Finance Market
- 1996** - Expands into Canada and the U.K.
- 1994** - Initial Public Offering (IPO)

Our focus is to recruit great people and create an environment where they can be great

- **FORTUNE World's Most Admired Companies**
- **"100 Best Companies to Work For" FORTUNE** magazine (We do not have the new logo yet)
- **"NAFE Top Companies For Executive Women"** The National Association for Female Executives
- **"America's Top Corporations for Women's Business Enterprises"** Women's Business Enterprise National Council (WBENC)
- **"U.S. President's Volunteer Service Award"** Junior Achievement
- **"100 Healthiest Workplaces in America"** Healthiest Employers
- **"Top 125"** Training magazine
- **Top Entry Level Employer** by CollegeGrad.com
- **"Best Places to Work"** in Tampa, Dallas, Houston, Tulsa, Richmond, Chicago and Oklahoma
- **No. 1 on 2016 Information Week "Elite 100"**
- **"Best Places to Work for LGBT Equality"** The Human Rights Campaign Foundation
- **"Working Mother 60 Best Companies"** Working Mother magazine
- **Military Times' 2016 "Best for Vets"**
- **G.I. Jobs Military-Friendly Employers** and **Military-Friendly Spouse Employers**
- **America's Top 50 Organizations for Multicultural Business Opportunities** DiversityBusiness.com
- **"WE USA Corporations of the Year"** Women Enterprise USA
- **"Top 50 Employers"** in CAREERS & the disABLED Magazine

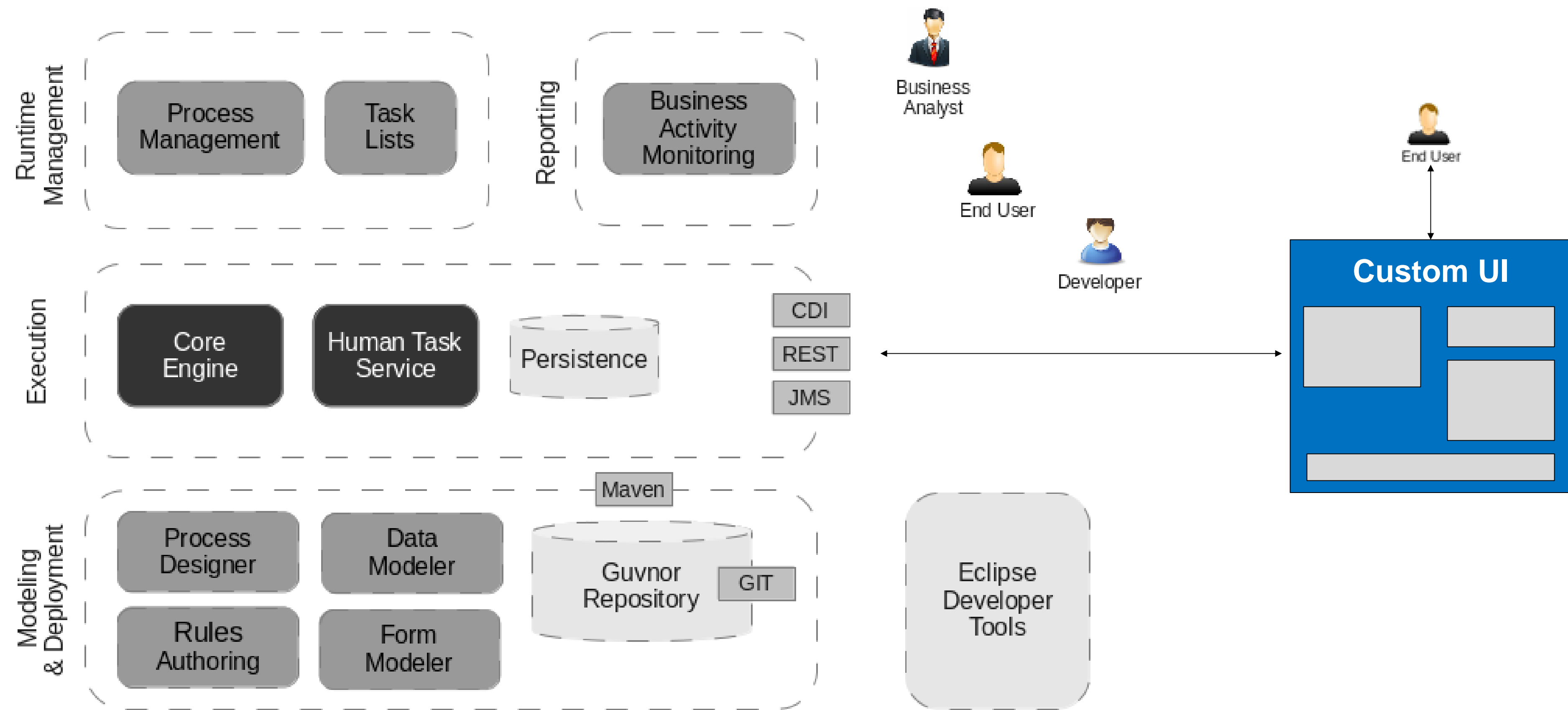


Public



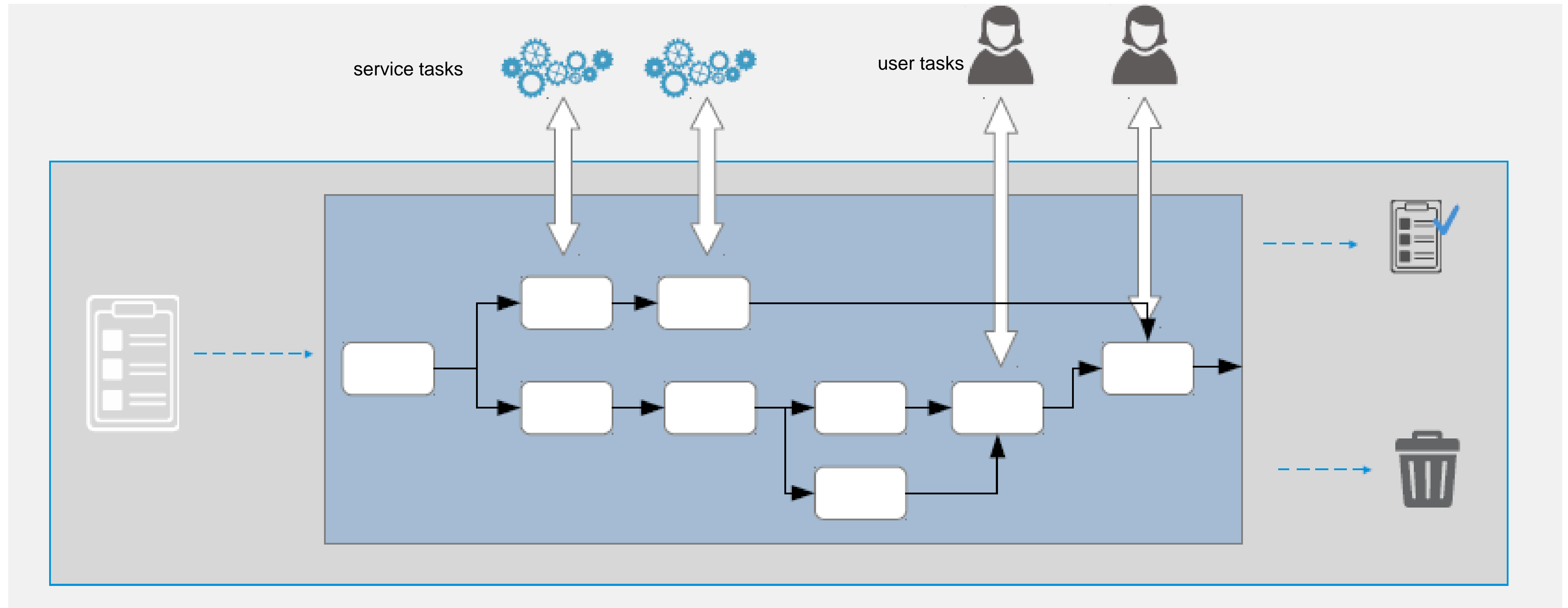
Technical Use Case – Human Workflow with API

- Allows Custom UI to be leveraged and integrate on the backend with jBPM APIs



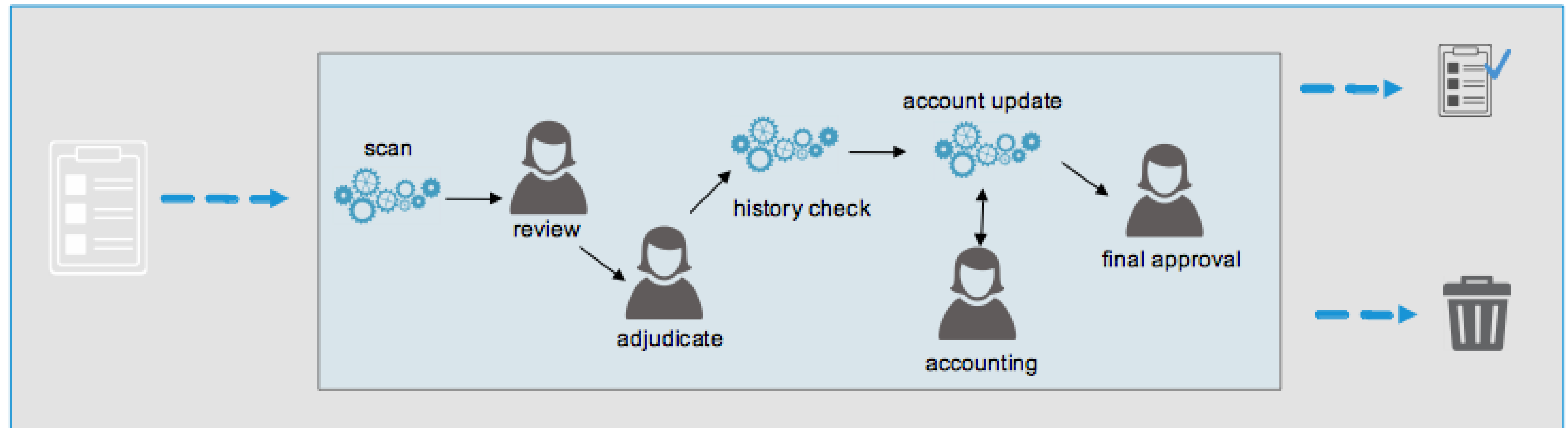
Technical Use Case – Headless Workflow / System to System

- Automates the calling of APIs in a particular order
- Can integrate human workflow / to User Tasks as needed



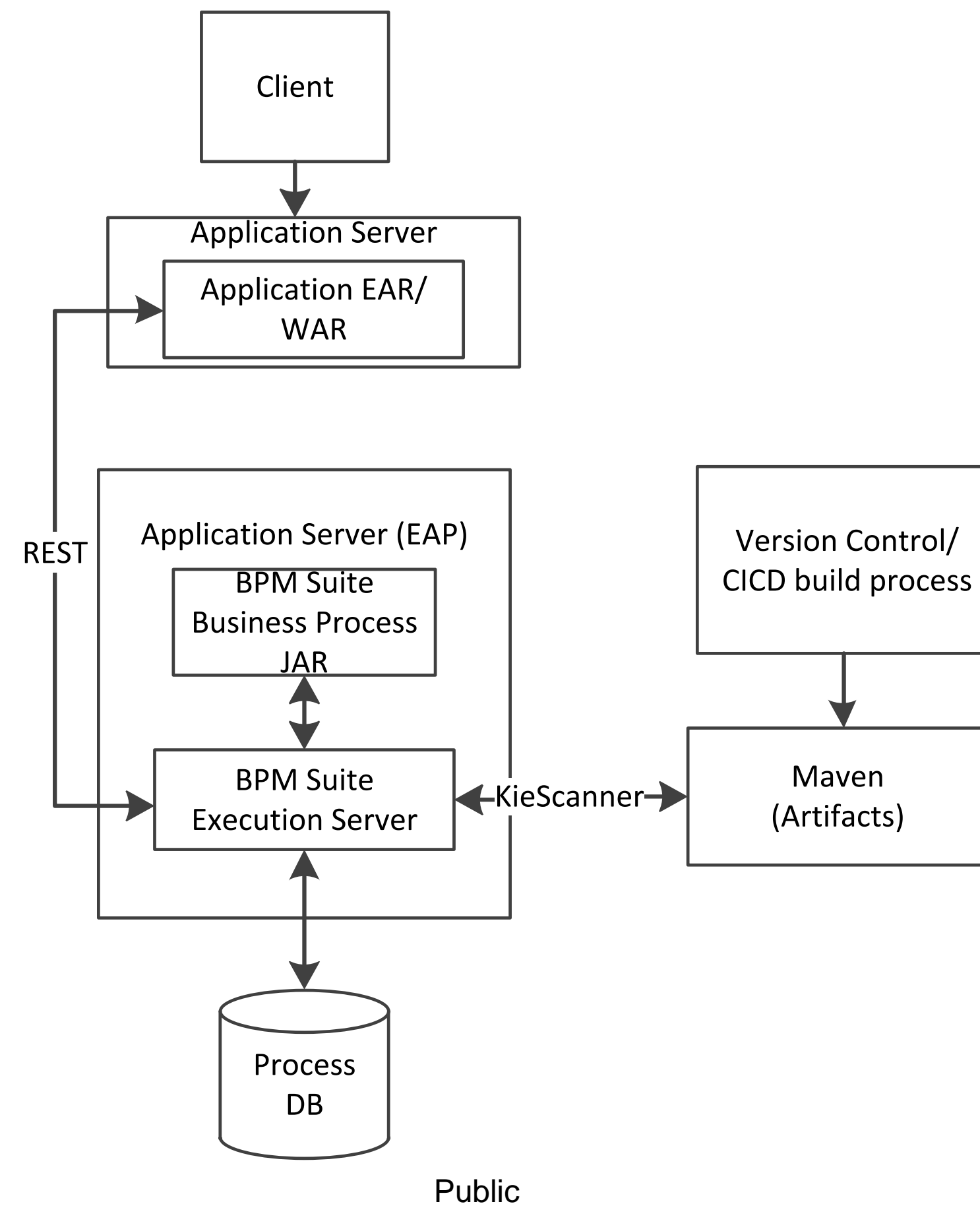
Technical Use Case – Integrate Business Rules into a Workflow

- Ability to invoke a set of rules (RuleFlow Group) at a particular point in the workflow (Business Rules Task)



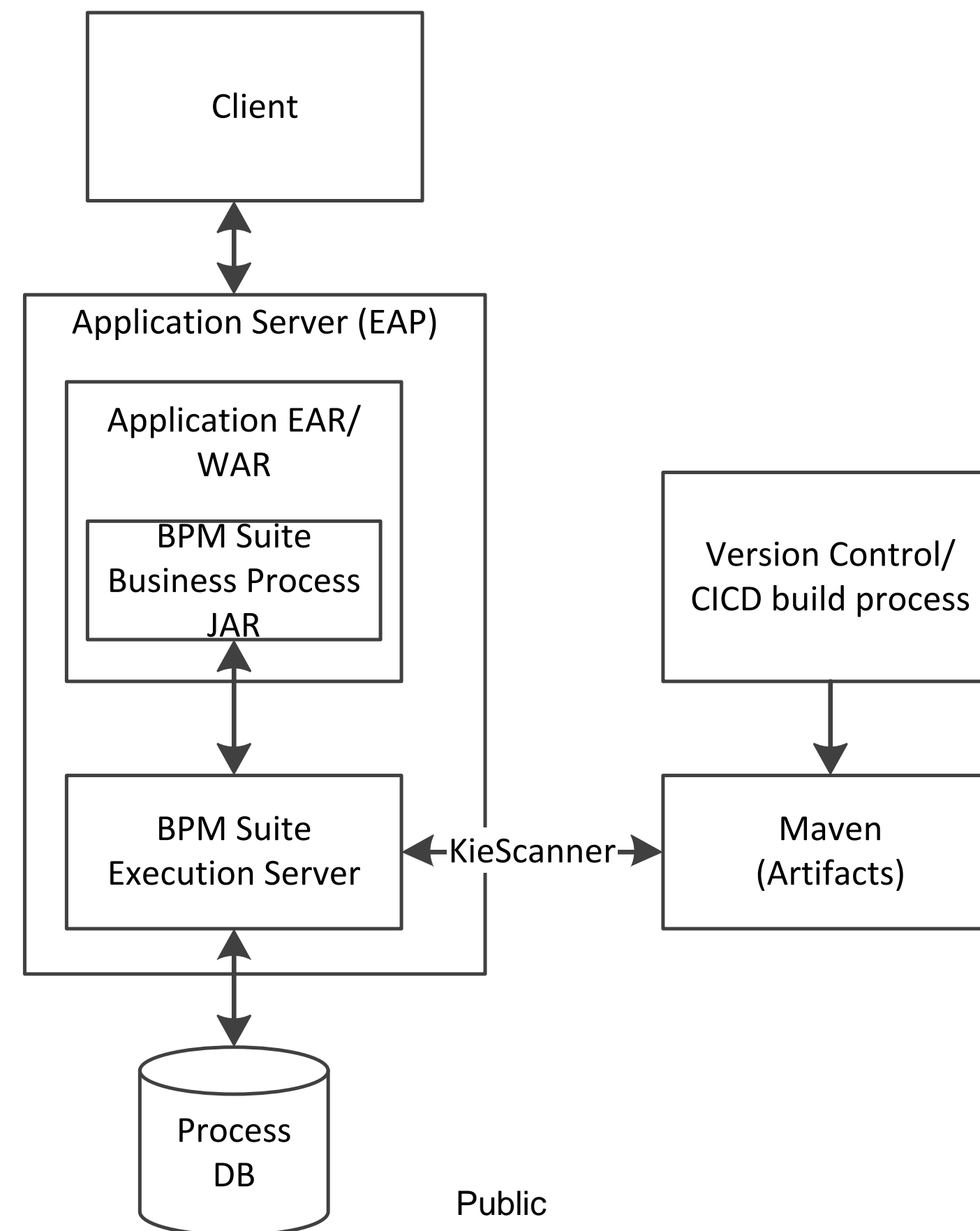
Technical Use Case – Stand-alone deployment to keep APIs stateless

- Application can interact with it via REST, JMS, Java APIs
- Decouples the workflow and/or rules from the application
- Enables the service to be reused by multiple applications
- Is typically used for stateful, long running, async approaches (human workflow)



Technical Use Case – Embedded deployment to add workflow to an existing application

- Runs as part of the application, under the same JVM
- Provides the best overall performance
- Can leverage all capabilities of the API
- Is typically used for stateless transactions (e.g. rules or non-stateful workflow)



Technical Use Case – Build microservices

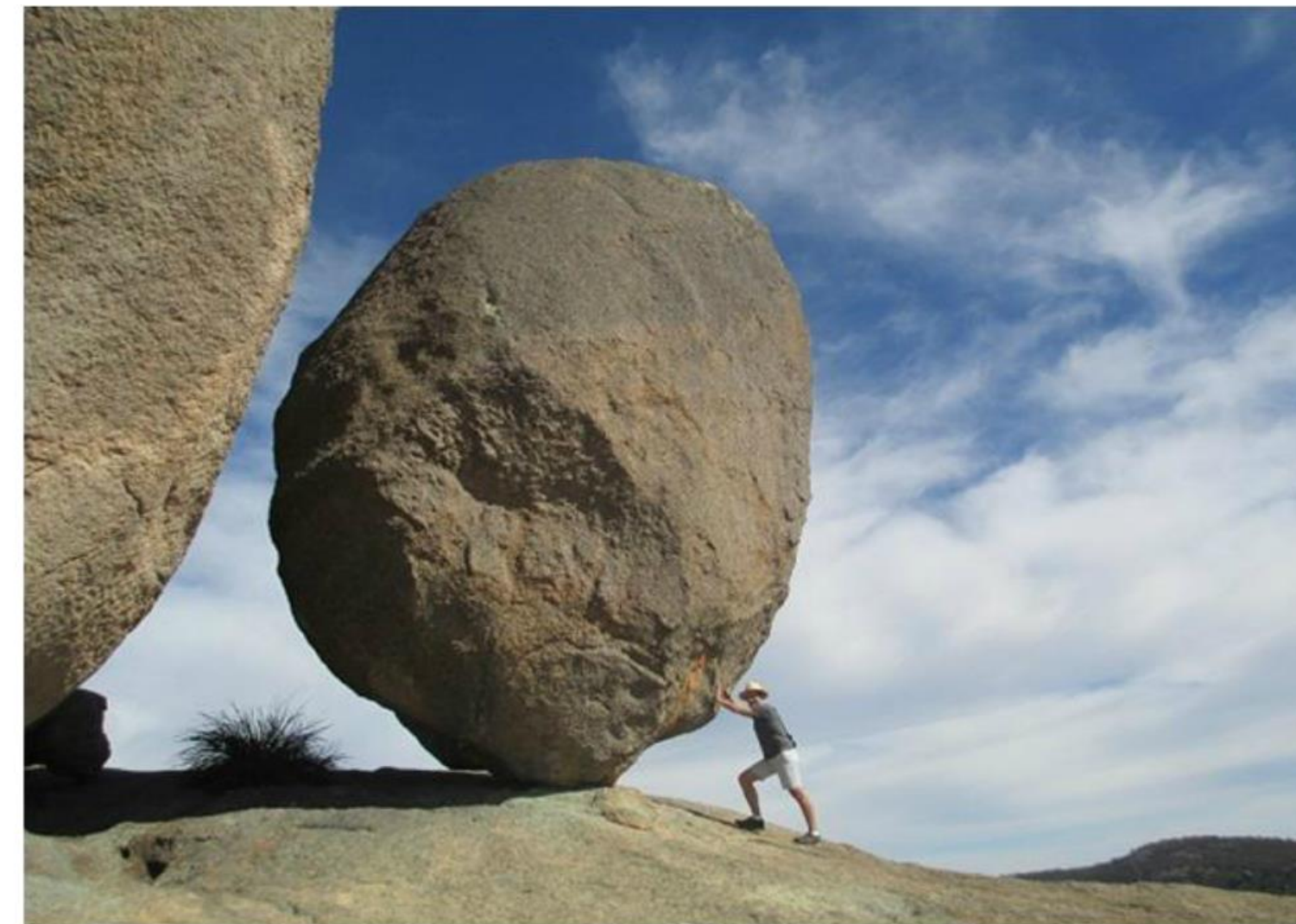
- **Can leverage sub-processes to break workflows up into smaller pieces**
- **Avoid creating dependencies**
 - Each BPM Suite microservice could have its own execution server & process database
 - Want to avoid sharing an Execution Server across microservices or microservice
- **Make the interactions atomic and understand the workflow boundaries to keep the microservice stateless**

Monolithic applications...

can have many dependencies



can be challenging to make a change



Key Technical Lessons Learned

- **Keep the database and application service in the same geographical region**
- **Minimize the # of API calls**
- **Strive for parallel, async activities**
- **Chose the right strategy for the RuntimeManager that matches your use case**
 - Singleton - runtime manager maintains single KieSession regardless of number of processes available
 - Per Request - runtime manager delivers new KieSession for every request
 - Per Process Instance - runtime manager maintains mapping between process instance and KieSession and always provides same KieSession whenever working with given process instance
- **Build up SMEs & establish a Community of Practice**

Finacle and Red Hat JBoss BPM Suite

Peter Loop

Associate Vice President and Principal Technology Architect

Infosys

Infosys - A global leader in consulting and technology

**\$9.2 billion annual revenues,
193,000+ staff / 98 nationalities**

1000+ clients globally

Offices in 40 countries & 77 cities

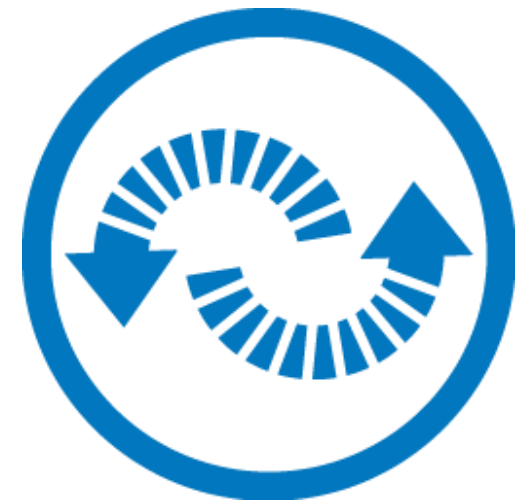


Over 33.5 % of revenues from FSI

Product Subsidiary - EdgeVerve

Product offerings from 20+ years

Finacle Universal Banking Solution



Comprehensive solution offerings - Core banking, Internet banking, Mobile banking, Payments, CRM, Wealth management, Treasury, Origination, among others



Global Coverage

- 84 Countries
- 480+ Installations
- Bank sizes from USD 100 Million to 1 Trillion



Serves 16.5 percent of world's adult banked population. Over 547 million customers access their finance through Finacle software.

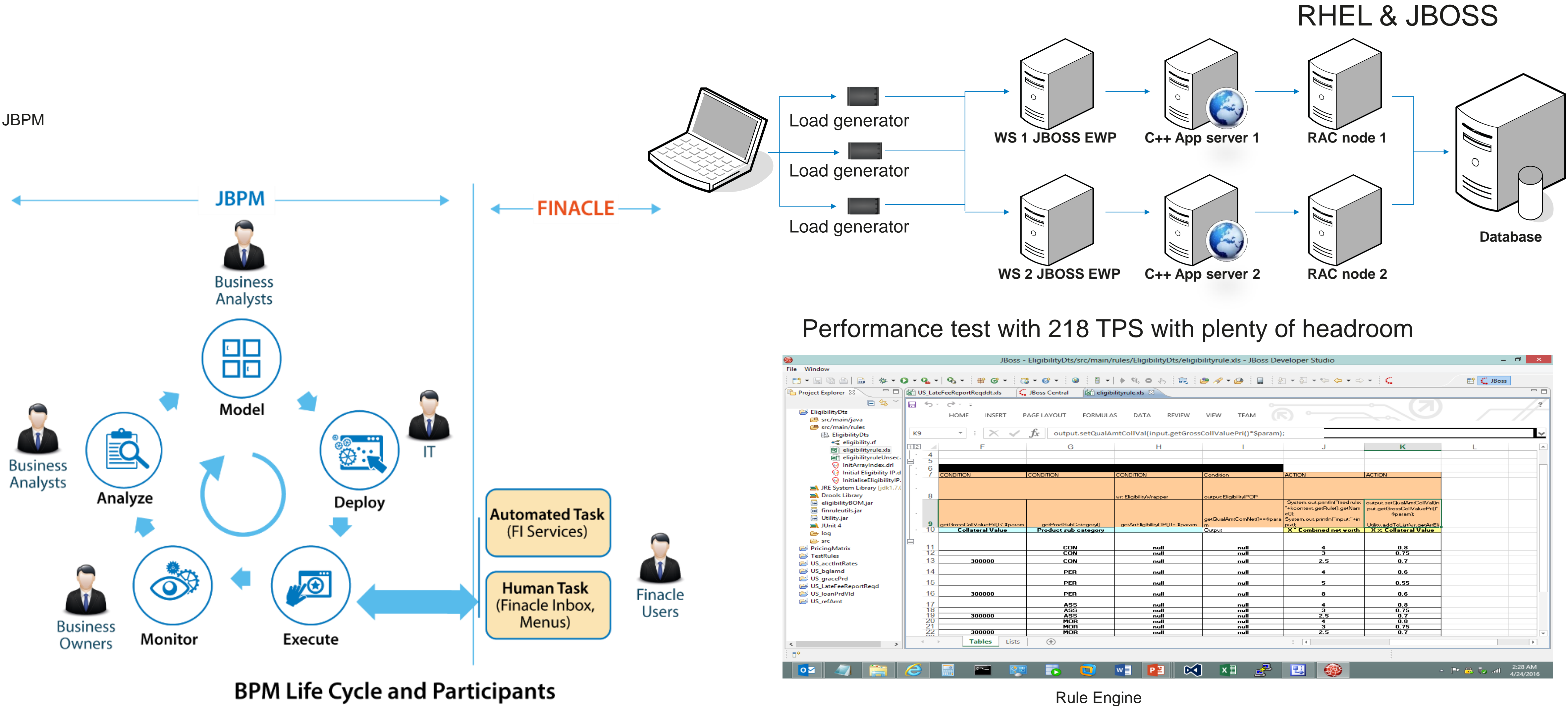


A leader in the industry

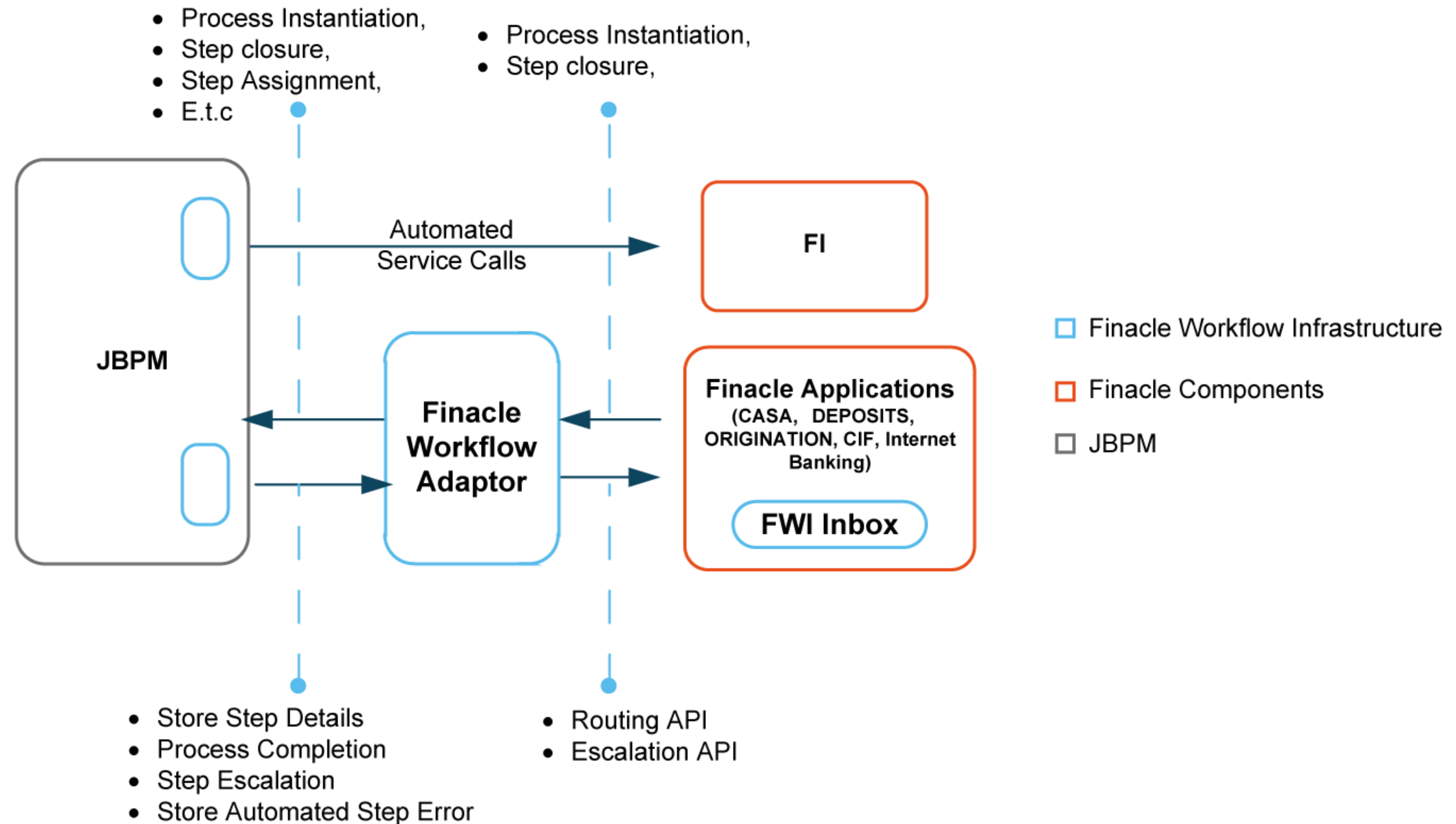
- Providing mission-critical software globally
- Proven to be most scalable platform

Infosys has been positioned as a leader in the Gartner Magic Quadrant for Global Retail Core Banking, 9 times in a row

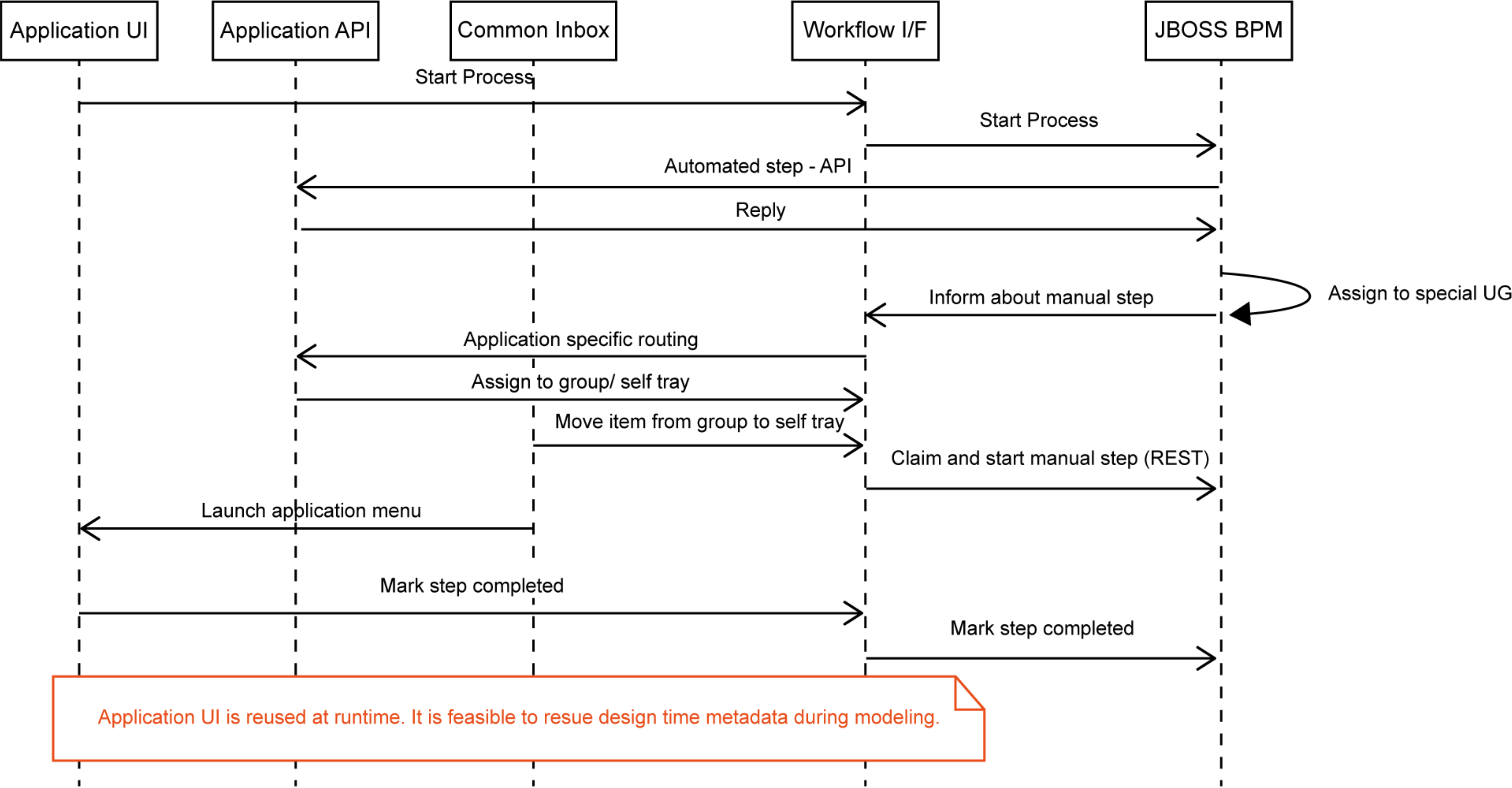
Finacle supports multiple Red Hat products



Finacle BPM Solution – Logical Architecture



Interface with JBOSS BPM Suite



Import application specific metadata for actions

The screenshot displays the Red Hat JBoss BPM Suite interface. The main window shows the 'Business Process [LOS_LOANPROCESS]' with a table for 'Add Assignment' and 'Import FINACLE metadata'. The table has columns: From Object, Assignment Type, To Object, and To Value. The 'Import FINACLE metadata' dialog is open, prompting the user to 'Select only .txt file' and showing the file 'AAFeeOrECPAdjustment.txt'. A WordPad window titled 'AAFeeOrECPAdjustment.txt - WordPad' is also open, displaying the metadata content.

	From Object	Assignment Type	To Object	To Value
1	CommandClass	is equal to		com.infosys.finacle.arch.wf.adap...
2	FWI_PR_SYS_BANK_ID	is mapped to	FWI_AS_SYS_BANK_ID	
3	FWI_AS_SYS_IN_SRVPROVIDER	is equal to		FI
4	FWI_AS_SYS_IN_SRVID	is equal to		ExecuteFCRMCustomService
5	ExecuteFCRMCustomService			
6	ExecuteFCRMCustomService			
7	ExecuteFCRMCustomService			
8	ExecuteFCRMCustomService			
9	ExecuteFCRMCustomService			

Import FINACLE metadata

Select only .txt file

File: Choose File AAFeeOrECPAdjustment.txt

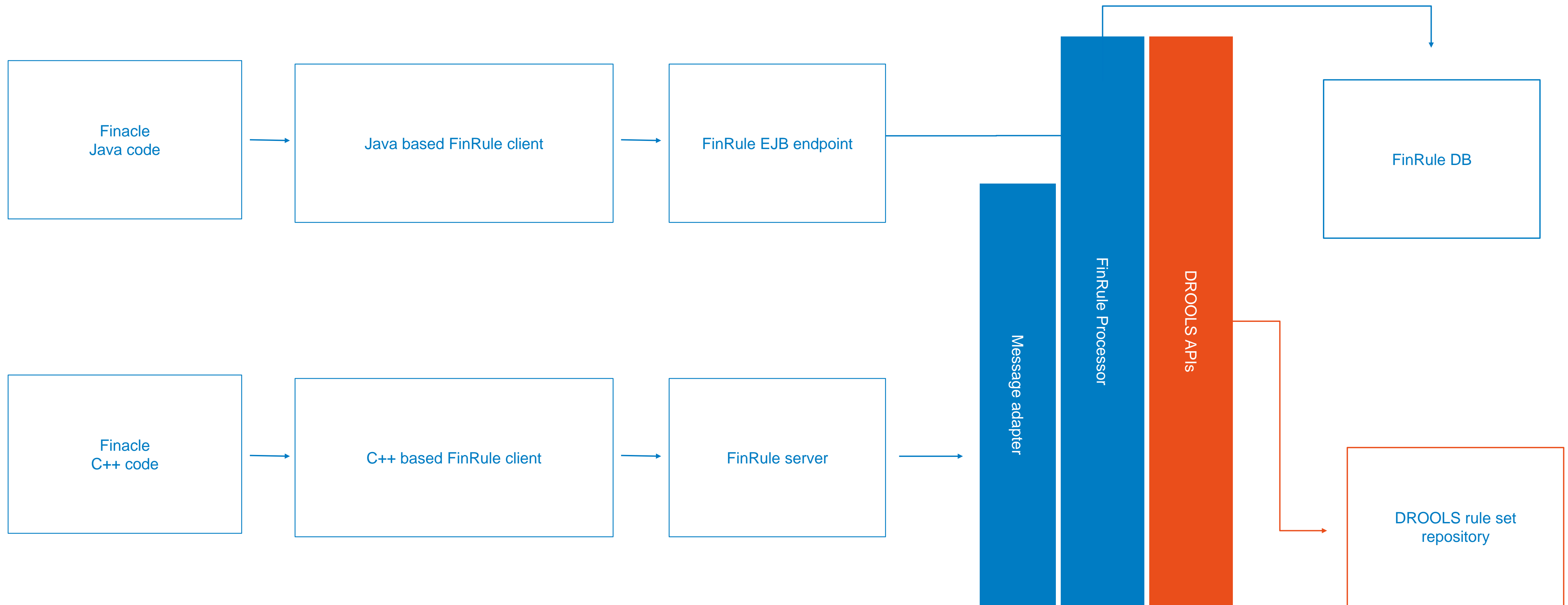
Import Close

Ok Cancel

Refresh

```
## This API carries out the updation and verification with the information provided.  
  
Assignment>  
CommandClass=...,FWI_AS_SYS_IN_SRVID= AAFeeOrECPAdjustment,FWI_AS_SYS_IN_SRVPROVIDER=FI  
DataInputSet>  
CommandClass:string,FWI_AS_SYS_IN_SRVID:string,...  
DataOutputSet>  
FWI_AS_SYS_OUT_STATUS:string,...
```

Interface to Rules Engine



Practical usage of rule engine

JBoss - EligibilityDts/src/main/rules/EligibilityDts/eligibilityrule.xls - JBoss Developer Studio

File Window

Project Explorer

- EligibilityDts
 - src/main/java
 - src/main/rules
 - EligibilityDts
- JRE System Library [jdk1.7.0_75]
- Drools Library
- eligibilityBOM.jar
- finruleutils.jar
- Utility.jar
- JUnit 4
- log
- src
- PricingMatrix
- TestRules
- US_acctIntRates
- US_bglamd
- US_gracePrd
- US_LateFeeReportReqd
- US_loanPrdVld
- US_refAmt

*eligibilityrule.xls

HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW TEAM

B24

	B	C	D	E	F	G	J
6		RuleTable: eligibilityrule					
7		CONDITION	CONDITION	CONDITION	CONDITION	CONDITION	ACTION
8		input: EligibilityIPOP					
9		getNetWorth() > \$param	getNetWorth() < \$param	getGrossCollValuePri() > \$param	getGrossCollValuePri() < \$param	getProdSubCategory()	System.out.println("Rule: " + kcontext.getRule().getName()); System.out.println("Input: " + kcontext.getInput());
10	Eligibility rules	Combined Net worth	Combined Net worth	Collateral Value	Collateral Value	Product sub category	X * Combined ne
11		100000	500000	200000		CON	4
12		500000		800000		CON	3
13			100000		300000	CON	2.5
14		100000	500000	200000		PER	4
15		500000		800000		PER	5
16			100000		300000	PER	8
17		100000	500000	200000		ASS	4
18		500000		800000		ASS	3
19			100000		300000	ASS	2.5
20		100000	500000	200000		MOR	4
21		500000		800000		MOR	3
22			100000		300000	MOR	2.5
23		100000	500000	200000		STU	4
24		500000		800000		STU	3
25			100000		300000	STU	2.5

Tables Lists

5:36 PM 5/12/2016

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Thank you

@edge_verve

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BPM Architectures at SIA

Emanuele Montrasi, Interoperability Payments Manager, SIA
Stefano Marfella, Extra

About SIA

THE GROUP



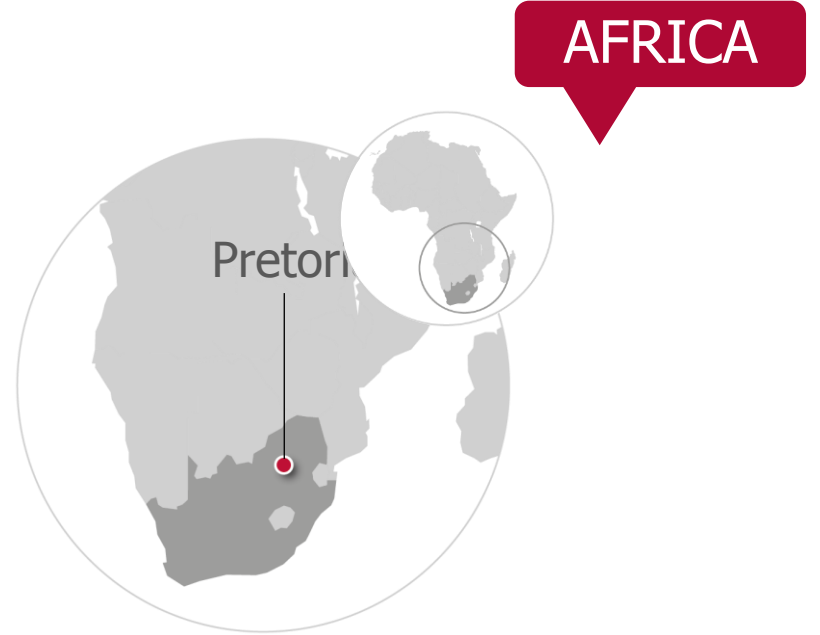
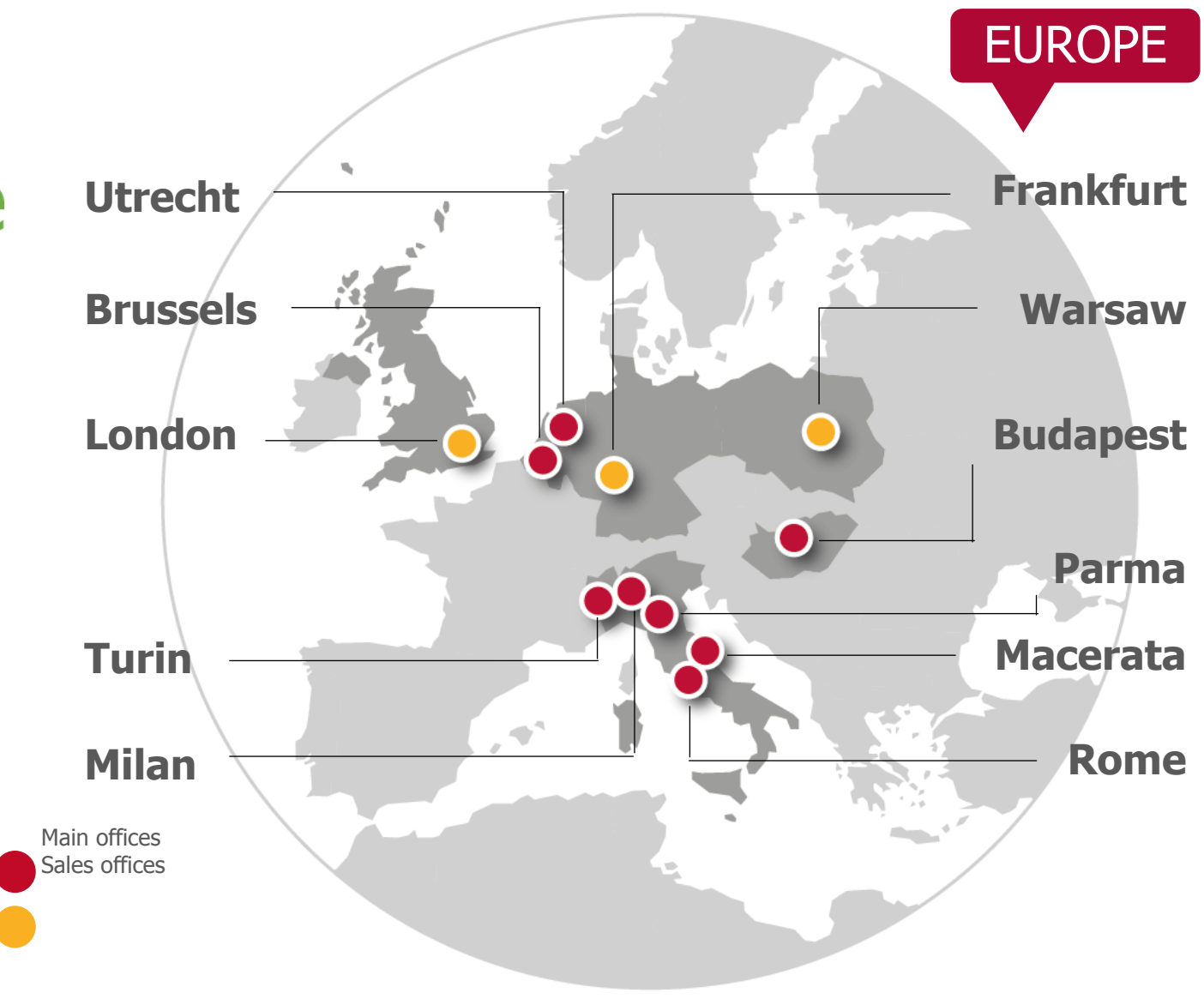
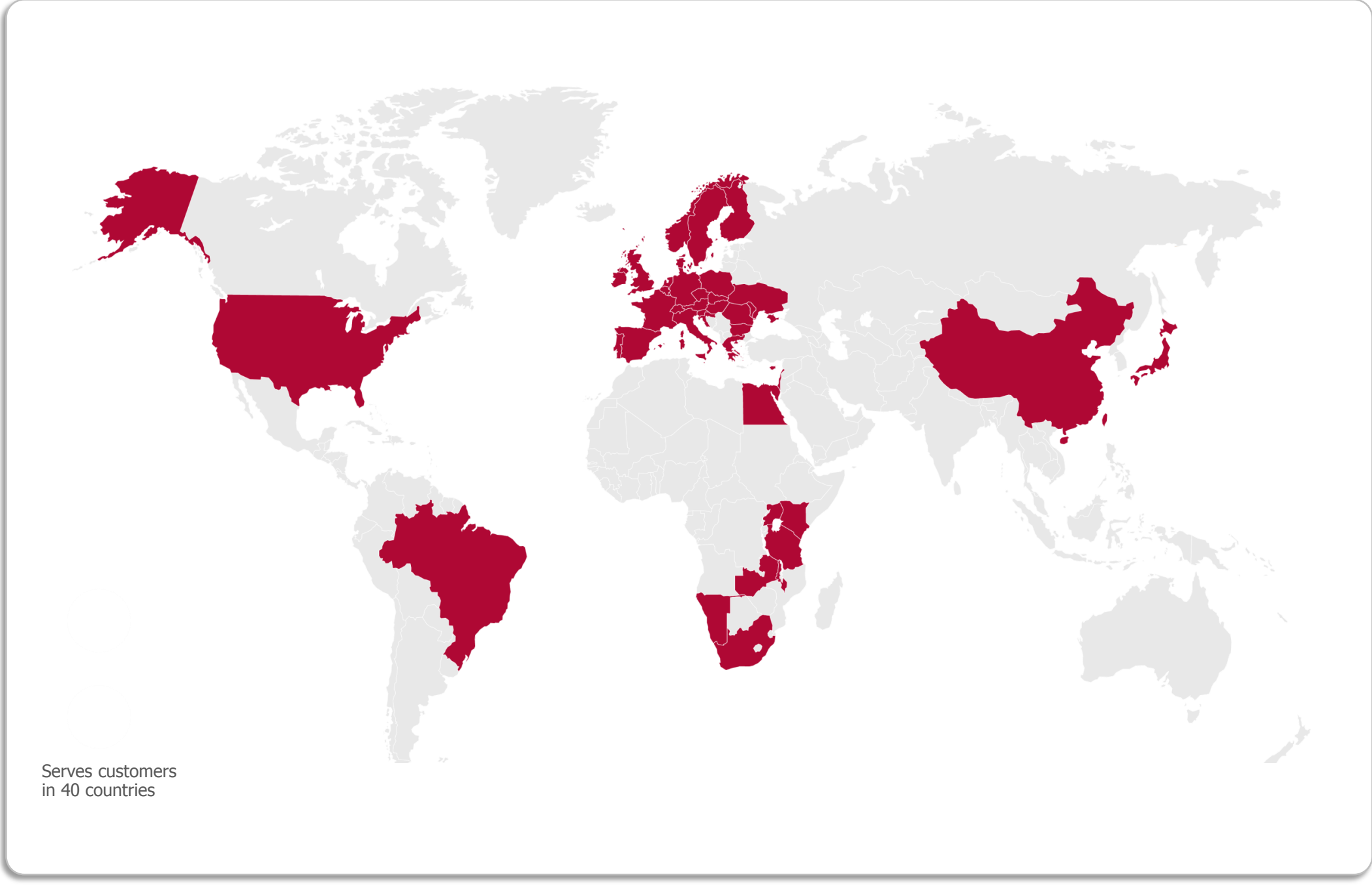
BUSINESS HIGHLIGHTS



Founded in July 1977



European leader in the areas of payments, cards, network services and capital markets



Full range of core services for each customer



Old Pre-Billing Solution & Pain Point

- Mainframe Application
- Rules inside the code
- Developers bear the rule management process
- Integration of a small number of SIA services
- Different Data Bases for pre-billing system and business intelligence
- No authorizing process
- No simulation feature

The Open Source Choice

- Drive for Application Modernization
- Opt for Red Hat BPM Suite (based on previous experiences with Red Hat products)
- Opt for the Red Hat Advanced Business Partner EXTRA

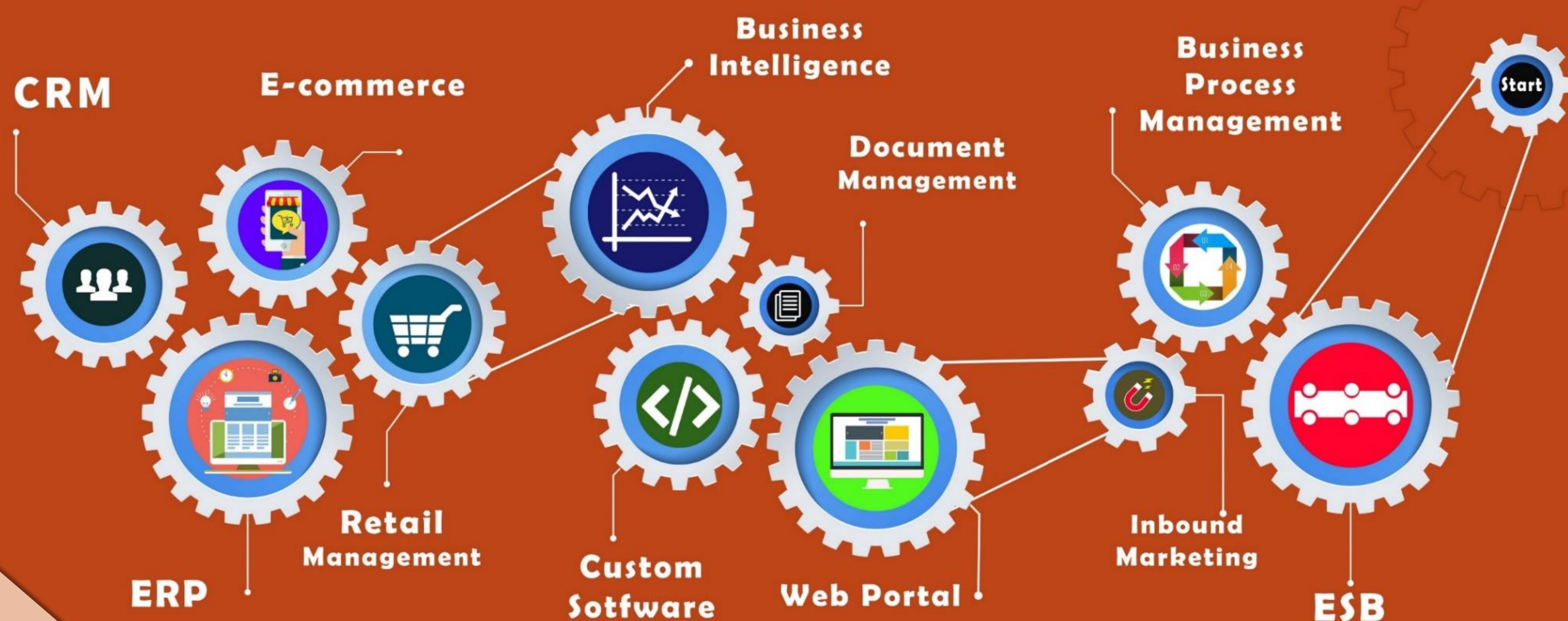


Smart Solutions, Open Integrations



ADVANCED

BUSINESS PARTNER



About 70 employees
Graduates in computer engineering, Science,
Business, Film production and ...

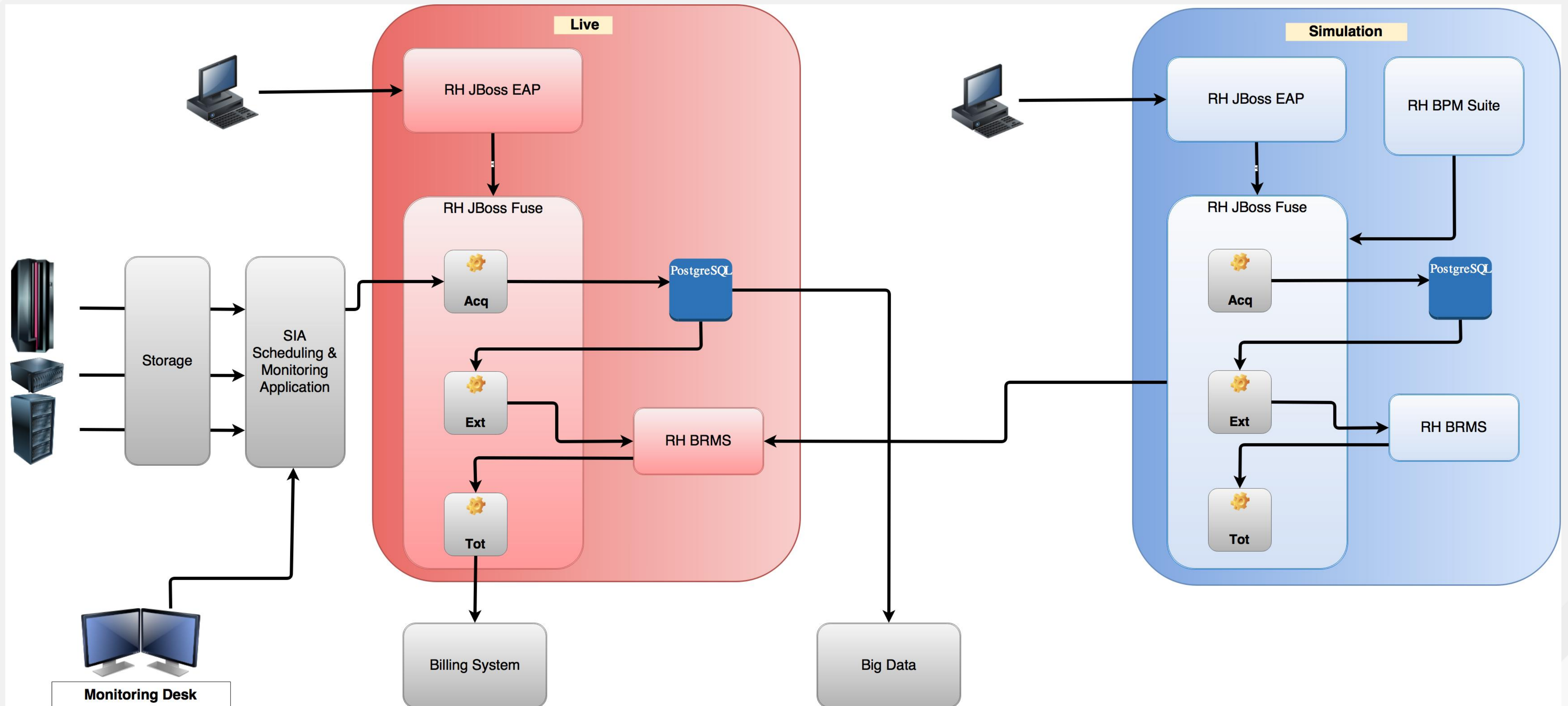


3 operating offices in Italy
1 Office in London

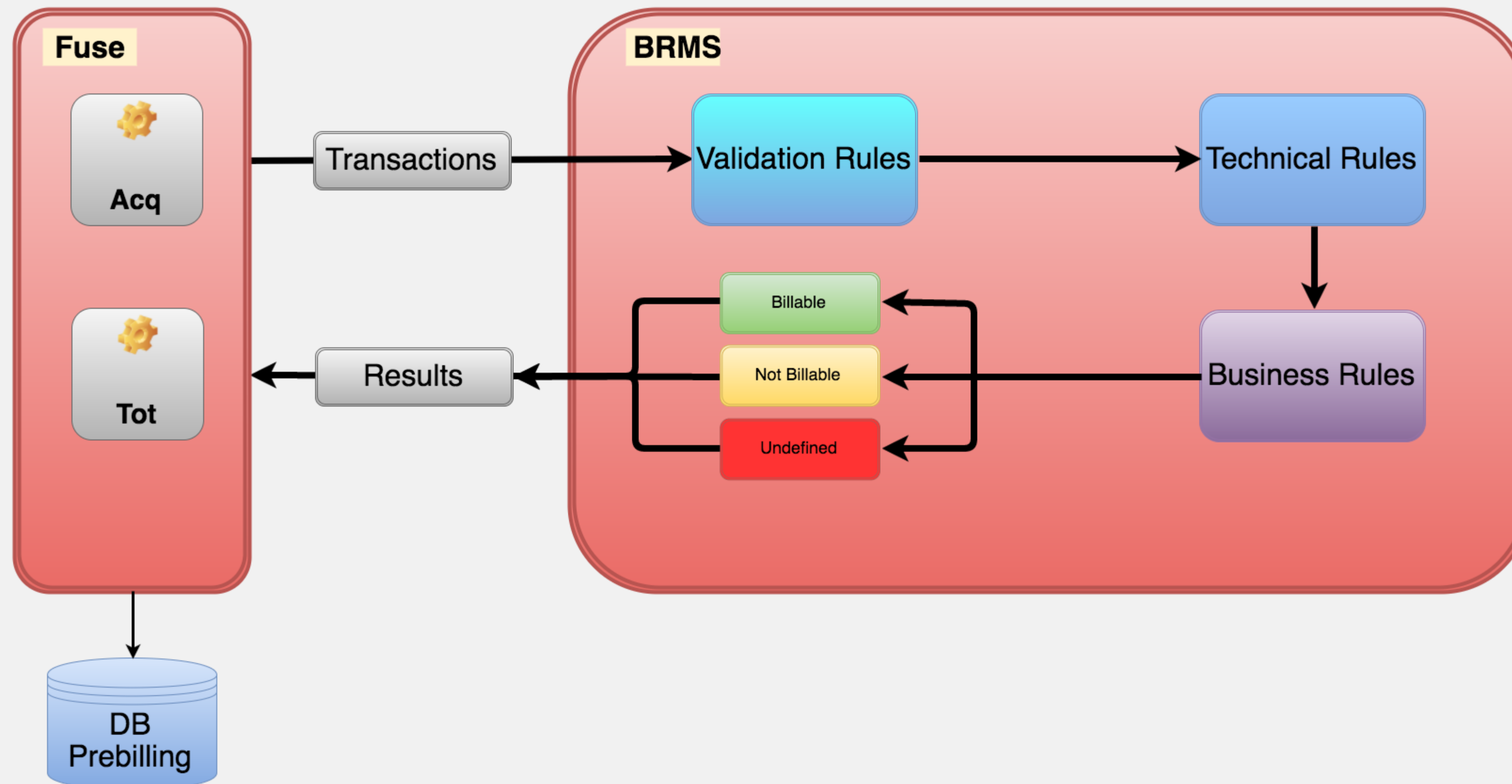


Over 300 projects
worldwide in 11
countries

Prebilling Process with Red Hat middleware

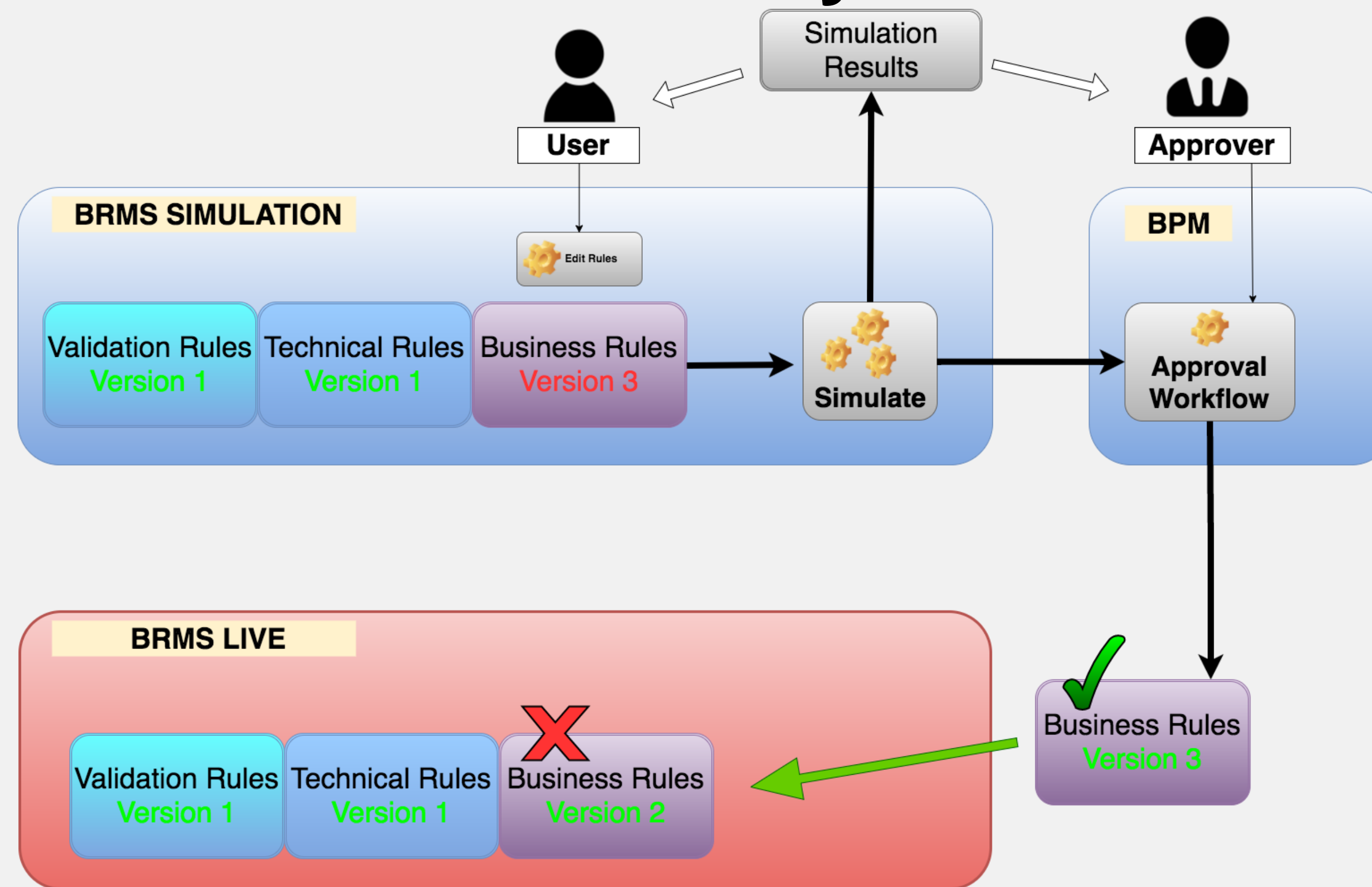


BRMS Integration



- BRMS integration through web services
- BRMS as rule repository and rule engine

Rule Continuous Delivery Process with BPM Suite



- The Authorizing Process at the end of the simulation phase directly promotes Business Rules from Simulation Environment to Live Environment creating a Hot Continuous Delivery Process

Main Achievements

- Simulation System
- Rule Management Process
- Rule Versioning System
- Business Rules Hot Deployment
- Cross Platform Integration
- Cross Platform Bimodal Development

Next Steps

- New Big Data from pre-billing DB
- Re-writing of old mainframe services
- Transferring of BPM Know-how to other authorizing processes



RED HAT **SUMMIT**

LEARN. NETWORK.
EXPERIENCE OPEN SOURCE.